

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
Region 5

**AMERICAN CHEMICAL SERVICE, INC. SITE**  
**Griffith, Indiana**

**FIVE-YEAR REVIEW (Type Ia)**

**I. Introduction**

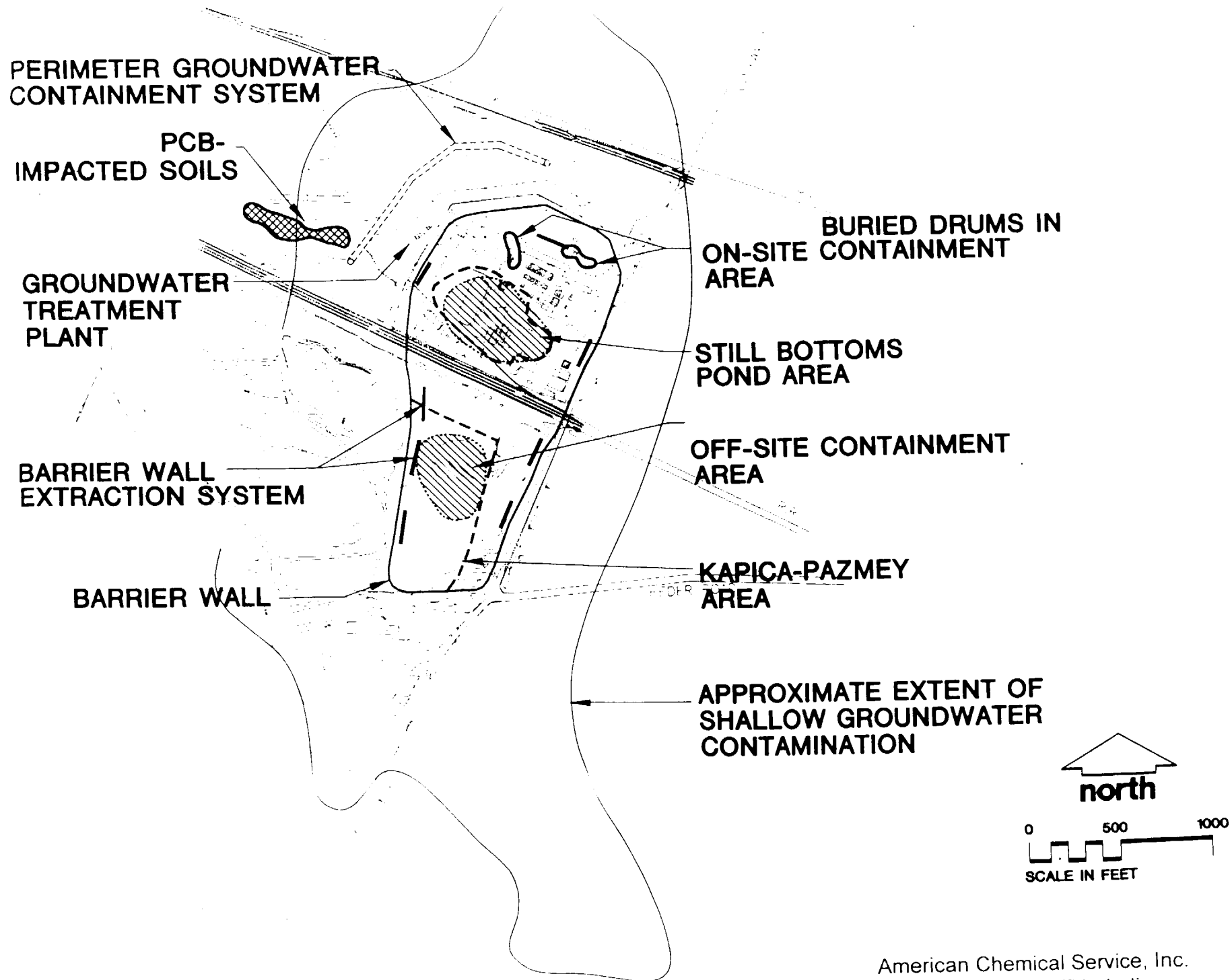
**Purpose**

The United States Environmental Protection Agency (U.S. EPA) has conducted a Type Ia five-year review for the American Chemical Service, Inc. (ACS) Superfund site pursuant to CERCLA section 121(c), NCP section 300.400(f)(4)(ii), and OSWER Directives 9355.7-02 (May 23, 1991), 9355.7-02A (July 26, 1994), and 9355.7-03A (December 21, 1995). The purpose of a five-year review is to ensure that a site remedy remains protective of human health and the environment and that the remedy is functioning as designed. A Type Ia five-year review is applicable to the ACS site since certain response actions (see below) are ongoing and several have yet to be constructed. This document will become part of the ACS site file and it will be placed into the site information repository located at the Griffith Branch Library, 940 N. Broad St., Griffith, IN and at the Griffith Township Hall, 111 N. Broad St., Griffith, IN.

**Site Characteristics**

The ACS Site is located at 420 S. Colfax Ave., Griffith, Indiana, (see Figure 1) and is comprised of 19 acres of American Chemical Service Corporation-owned or leased property which includes the so-called "Off-Site Containment" and the "On-Site Containment" areas, the 2-acre property known as the "Kapica-Pazmeyer" property, and a 15-acre portion of the Griffith Municipal Landfill. Groundwater contaminant plumes emanate from the ACS site (as demonstrated in Figure 1) and site wastes have impacted certain nearby wetland areas.

American Chemical Service, Inc. began a solvent recovery business on the ACS property in May 1955. ACS past waste handling, storage, and disposal practices led to the contamination of the site (except for the Town of Griffith Landfill area and the Kapica-Pazmeyer area), to the extent described in the 1992 ROD and other documents. ACS ceased its solvent reclaiming activities upon losing its interim (authorization to operate) status under the Resource Conservation and Recovery Act (RCRA) in 1990, although it continues its specialty chemical manufacturing operations to this day.



-2-

FIGURE 1  
American Chemical Service, Inc.  
Superfund site, Griffith, Indiana

Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, U.S. EPA placed the ACS Site on the National Priorities List, set forth at 40 CFR Part 300, Appendix B, by publication in the Federal Register on September 21, 1984 (49 Fed. Reg. 37070).

## **Remedial Investigation**

The ACS Site has been extensively studied and tested to determine the nature and extent of chemical contamination in and around the site. The Remedial Investigation (RI) report shows that there are large areas on site with numerous types of buried contaminants that are both sources of groundwater contamination and potential contact hazards for site workers. Major waste categories include volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and heavy metals. These contaminants are found at variable concentrations within the Off-site Containment area, the Kapica/Pazmey area, and in the On-site Containment area. Volatile organic compounds such as benzene and chloroethane are a concern in area groundwater.

## **1992 Record of Decision**

U.S. EPA issued a Record of Decision in September 1992; the purpose of the selected remedy was to restore the contaminated property using cleanup levels that would allow the future unrestricted use of the property, i.e., for residential use. U.S. EPA contemplated the use of groundwater-use restrictions for areas directly under the site and beyond ACSC property boundaries until the groundwater quality was restored to drinkable status. The following methods were to be used to perform the cleanup at the ACS site:

1. The excavation of buried wastes and up to 135,000 cubic yards of contaminated soils and debris, with subsequent on-site treatment of organic contaminants using low-temperature thermal desorption (LTTD) on soils and other methods such as steam-cleaning on the debris. Metals-containing residuals may have required a further immobilization step.
2. The off-site disposal of miscellaneous debris.
3. The excavation of approximately 400 drums in the On-site Containment area with shipment off site for incineration of the contents.
4. The implementation of soil vapor extraction (SVE) of VOC-contaminated soils, including the performance of a SVE pilot study in the buried waste in the On-site Containment area.

5. The construction of a groundwater extraction and treatment system capable of dewatering the site and also containing the off-site groundwater contaminant plume. Treated water would be discharged to the wetlands.
6. The further evaluation and monitoring of the impacted wetlands with possible cleanup of the wetlands.
7. The placement of a security fence around the site to prevent access to contaminants and the implementation of deed restrictions on the property.
8. The implementation of long term groundwater monitoring, including private well sampling. Impacted wells would be subjected to closure or the owner would receive groundwater-use advisories.

The 1992 ROD also called for the LTTD and SVE systems to undergo treatability testing to determine if these cleanup methods would be able to attain final cleanup levels.

Based on a combined estimated volume of 135,000 cubic yards of impacted soil and debris, the 1992 ROD estimated that the selected cleanup remedy would cost between \$38 million and \$47 million to construct and implement over a 6-year to 8-year time frame.

### **Site History Post-1992 ROD**

In selecting the remedial action for the ACS site, U.S. EPA had relied upon, among other factors, waste-treatment volume estimates drawn from the RI report. After releasing the 1992 ROD, and in preparation for implementation of the cleanup, U.S. EPA conducted both additional sampling at the site and site-waste materials handling and treatability studies in 1997 to ascertain the accuracy of the soil volume estimate and to determine if LTTD was a viable cleanup remedy for the ACS site. The reports entitled "Pretreatment/Materials Handling Study Report" (1997) and "Thermal Treatability Study" (1998) contain the results of these testing efforts.

Results of the Materials Handling Study indicated that an estimated volume of 150,000 to 200,000 cubic yards of contaminated waste, soils, and debris would have to be excavated and treated using LTTD alone to remove VOCs, in order to meet the residential cleanup levels contained in the 1992 ROD. U.S. EPA found that municipal waste and other debris was not treatable using the steam cleaning method chosen in the 1992 ROD. Thus, the estimated volume of soils to be treated using the resource-intensive LTTD method had greatly increased. Moreover, much of the material could not be treated effectively using LTTD, since some of the waste stream was municipal waste and the VOC-mass was undercalculated. Municipal waste is not amenable to LTTD, and new disposal methods would have had to be found. The waste handling

study results projected the need for an extra high level of safety requirements for site workers due to the high levels of VOCs that would be encountered when contaminated soils, wastes, and debris were excavated for treatment. The high levels of VOCs could constitute an explosion hazard as well as an exposure hazard to site cleanup workers, and plausibly to area residents.

U.S. EPA also concluded that other management options were necessary for ACS site wastes, because LTDD was not a practicable treatment alternative, and on-site incineration, which would be required to properly treat the excavated wastes, is more expensive and perhaps not allowable under Indiana State law. Based upon the findings of the materials handling studies, the recalculated cleanup cost estimate for the 1992 ROD remedy was \$150 million to \$246 million (present worth-1997), a substantial increase from the original \$38-47 million (present worth -1992) cost estimate.

U.S. EPA also performed sampling of wetland soils/sediments during 1996 to delineate the extent of PCB-impacted soil/sediment. Some areas contain PCBs in soil/sediment above 1 ppm, with values exceeding 50 ppm in some cases. U.S. EPA, in consultation with IDEM and wetlands experts, has determined that wetland soil/sediments containing greater than 1 ppm PCBs should be excavated and managed on-site or disposed of properly off-site.

During 1996-1997, U.S. EPA performed further sampling work to more fully delineate the off-site groundwater contaminant plumes. As seen in Figure 1, groundwater contaminant plumes, defined as those areas at which the groundwater exceeds contaminant cleanup levels, are present in the northern and southern areas of the site. Aquifer characteristics are such that it may be impracticable to implement a plume-wide groundwater pump-and-treat program to restore groundwater quality. U.S. EPA is evaluating the use of a combination of active restoration methods, such as groundwater pump-and-treat and in-situ oxidation strategies, and monitored natural attenuation to effect cleanup of the groundwater. Monitored natural attenuation consists of the monitoring of natural processes in the aquifer which act to biodegrade, dilute, or adsorb groundwater contaminants so as to make them immobile, dilute, or break down into less harmful compounds to prevent exposure to harmful levels of contaminants.

### **1999 ROD Amendment**

U.S. EPA issued a ROD amendment in July 1999, based upon the new information created by the Material Handling Study work described above, and a request from the ACS PRP Group that U.S. EPA reconsider the future site-use assumption in making a cleanup decision. U.S. EPA now assumes the future use of the site property will be industrial, in concert with the current zoning designation assigned by the Town of Griffith. U.S. EPA would have concerns regarding the health and safety of site cleanup workers, ACSC workers, and the surrounding public should widespread waste

excavation occur, since the high levels of VOCs could create a health hazard. Lastly, the treatability studies show that the selected treatment method, LTDD, would not be effective in treating a majority of site wastes.

The ROD Amendment provides for the protection of human health and the environment through a combination of the following:

## **1. Limitations on the potential for future exposure to contaminants**

U.S. EPA determined that two methods would be used to isolate contaminated areas to prevent future exposure to site contaminants:

### **a. Barrier Technologies**

U.S. EPA would construct a subsurface barrier wall (sometimes termed a "slurry wall"), on the ACS site to minimize the movement of site contaminants off-site and to impede groundwater flow into the site, as described by Alternative 2 of the 1992 ROD. The barrier wall would be keyed into a clay confining layer approximately 25 feet below the surface. The pumping of groundwater from within the area surrounded by the slurry wall would maintain an inward groundwater gradient across the wall, where technically practicable. Contaminant source areas would be covered with a soil cap to reduce the infiltration of rainwater and snowmelt into the area enclosed by the slurry wall, and to prevent workers from directly contacting site contaminants. (Note: a barrier wall consisting of high-density polyethylene plastic and a bentonite-soil slurry was installed on the ACS site in 1997, see Figure 1.)

### **b. Deed Restriction**

A deed restriction will be maintained on the ACS property so that the future use of the property will be restricted to those activities which do not interfere with the performance of any cleanup activities listed in the 1992 ROD and this ROD Amendment, or disturb the integrity of the soil cap to be placed over the site.

## **2. Treatment of subsurface soils through soil vapor extraction**

U.S. EPA would dewater the area behind the barrier wall, using a series of groundwater pumping wells, to allow for the excavation of intact drums containing hazardous wastes. Intact buried drums in the On-site Containment Area would be incinerated off-site. An in-situ vapor extraction (SVE) system would then be installed in certain areas of the site to treat both soils and buried wastes to remove VOCs and to also help to biodegrade VOCs and SVOCs in the ground. Removal of VOCs helps to prevent failure of the slurry wall and removes the explosion hazard associated with excavation of the soils. Collected VOCs and SVOCs would be destroyed on-site using catalytic oxidation equipment or captured on activated carbon for off-site destruction or disposal.

### **3. Extraction and treatment of contaminated ground water**

Groundwater pumping and treatment would be performed in certain areas outside the barrier wall to restore groundwater quality. Treated groundwater would be discharged to the wetlands. Monitored natural attenuation and in-ground treatment methods may also be tested and used if successfully proven to restore groundwater quality. Natural attenuation is the general process of monitoring water quality over a period of time to demonstrate that natural processes are causing contaminant levels to fall due to a combination of dilution, biodegradation, and sorption forces within the groundwater aquifer. Should dilution, biodegradation, and sorption forces cause water quality to improve in a reasonable time frame versus active treatment methods, then monitored natural attenuation can be considered to be a viable cleanup alternative for groundwater. In ground treatment methods could include the introduction of oxygen-releasing compounds into the contaminant areas to aid in the biodegradation of organic compounds, and improve water quality.

U.S. EPA is currently collecting all appropriate data for the above alternatives to the groundwater pump and treat remedy selected in the 1992 ROD, to determine whether they could be used effectively at the ACS site. The agency expects to conclude its evaluation by Summer 2002. By that time, U.S. EPA will have examined all data and performed an analysis to determine whether the alternative methods would be expected to achieve the 1992 ROD cleanup goals in a reasonable timeframe for area groundwater. If the alternative methods appear to be viable, then U.S. EPA will consider a further amendment of the 1992 ROD by releasing another proposed plan for public comment.

### **4. Excavation of impacted wetlands soils**

To remove direct contact hazards, the excavation of PCB-laden wetland soil/sediment, with the consolidation under the on-site cap of materials with less than 50 ppm, and the disposal off-site of material containing greater than 50 ppm, would be performed.

## **II. Discussion of Remedial Objectives**

U.S. EPA entered into a RD/RA consent decree for the ACS site on January 9, 2001. The Settling Defendants have completed a Final Remedial Design Report and are implementing the provisions of the Final Remedial Design Report under the consent decree.

Earlier, while the treatability and materials handling studies were being performed, the Settling Defendants designed and then constructed certain aspects of the cleanup remedy. The subsurface barrier wall was installed around the ACS, Inc. property in 1997 in an effort to contain the wastes on site. Design for the interim groundwater

extraction system was initiated in April 1996 (triggering this five-year review) and the system was then installed inside the barrier wall to dewater the area to prevent movement of groundwater over and outside of the wall. Lastly, an interim groundwater extraction system was installed in the northern area of the site to control the movement of the more highly impacted groundwater in this area. Water pumped from both systems is being routed to an on-site treatment plant to remove the chemical contaminants before the cleaned water is discharged into the wetland areas. A final inspection was conducted by the U.S. EPA project manager and representatives of the Settling Defendants on May 12, 1999, whereby all the punch list items were shown to have been completed at that time.

### **Quality Assurance/Quality Control**

Remedial design and remedial action construction management activities at the site were conducted by the design contractor with oversight provided by U.S. EPA through the RAC contracting program. All design plans and field activities were reviewed and approved by U.S. EPA to ensure consistency with the ROD and ROD Amendment, the RD and RA work plans, and federal and state requirements.

The design and construction QA/QC program utilized throughout the RD/RA was in accordance with U.S. EPA protocols. Details of the analytical procedures used to ensure the quality of the work are contained in the approved Quality Assurance Project Plan (QAPP) for the pre-design studies and for construction of the groundwater extraction and treatment system and barrier wall (Construction Quality Assurance Plan (CQAP)). The construction QA/QC program utilized has been sufficient to allow U.S. EPA to make the determination that all reported materials specifications are adequate and construction methods used allowed remedy construction to be satisfactorily performed in accordance with the ROD or ROD Amendment.

### **Monitoring Program**

A groundwater monitoring program was established for the interim phase of the cleanup action. Groundwater and treated effluent are monitored on a periodic basis to ensure that the interim remedial actions remain effective while the remainder of the remedial components are installed. The Settling Defendants perform quarterly groundwater monitoring to detail contaminant trends in the groundwater as the remainder of the cleanup remedy is installed. Water level monitoring also tracks whether the barrier wall is performing as designed. Analytes include the chemicals of concern listed in the ROD and those parameters required under the discharge "permit" issued by IDEM. U.S. EPA will certify completion of groundwater remediation activities once it has been determined that cleanup levels have been attained and maintained for all chemicals of concern listed in the ROD or ROD Amendment.



## Results

As stated above, groundwater extraction, treatment, and monitoring will be required until it has been demonstrated that groundwater cleanup levels have been attained. The ROD, as amended, estimated that the groundwater extraction and treatment system would need to operate for between 5 and 30 years to achieve required cleanup levels. Currently, VOCs remain above cleanup levels in the groundwater beneath the site.

## III. Recommendations

The construction of the barrier wall and the groundwater extraction and treatment system was completed in 1998 and operation and maintenance of these systems are ongoing. U.S. EPA recommends that the groundwater treatment system continue to be operated at the ACS site as designed until final groundwater cleanup levels, as set forth in the ROD, as amended, are achieved.

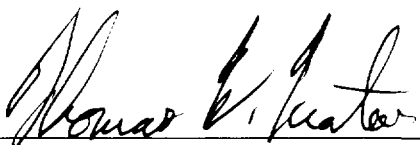
Further, construction of the other portions of the cleanup remedy began in January 2001 and are scheduled to be completed in 2005. The SVE system will be then operated for a number of years until the system no longer is efficient. U.S. EPA recommends that these remedial components be constructed and operated as designed.


## IV. Statement on Protectiveness

With the pending construction of the final remedial action components and the continuing operation of the barrier wall and the groundwater extraction and treatment systems pursuant to the ROD, as amended, as designed, the remedy selected for the ACS site remains protective of human health and the environment.

## V. Next Five-year Review

The next five-year review at the ACS site is scheduled to be conducted on or about April 30, 2006.

  
for William E. Muno, Director  
Superfund Division

  
Date